CLAIMS:

1. A method of calculating iteration values for free parameters $\lambda\alpha$ in the maximum-entropy speech model in accordance with the following general training algorithm:

$$\lambda_\alpha^{(n+1)}\Big|_{\alpha\in \mathrm{A}i(n)} = G(\lambda_\alpha^{(n)}, m_\alpha, m_\alpha^{(n)}, \ldots)\Big|_{\alpha\in \mathrm{A}i(n)}$$

where:

n: refers to an iteration parameter that represents a current iteration step;

Ai: represents the i-th attributes group in the speech model, where $1 \leq i \leq m$;

Ai(n): represents the attributes group selected in the n-th iteration step;

α: represents a attribute in the speech model;

G: represents a mathematical function;

$\lambda_\alpha^{(n)}$: represents the n-th iteration value for the free parameter $\lambda\alpha$;

m_α: represents a desired boundary value for the attribute α; and

$m_\alpha^{(n)}$: represents the n-th iteration boundary value for the desired boundary value $m\alpha$,

where one attribute group Ai(n) from a total of m speech model attribute groups is assigned to each iteration parameter n, and where the iteration values $\lambda_\alpha^{(n+1)}$ are calculated for each and every attribute α from the currently assigned attribute group Ai(n), characterized in that the current iteration parameter n is assigned the attribute group Ai(n), where $1 \leq i(n) \leq m$, for which, in accordance with a predefined criterion, the adaptation of the iteration boundary values $m_\alpha^{(n)}$ to the respective associated desired boundary values $m\alpha$ is the worst of all the m attribute groups of the speech model.

2. A method as claimed in Claim 1, characterized in that the following steps for calculating and evaluating the criterion are included before each incrementation of the iteration parameter n:

a) Calculating current iteration boundary values $m_\alpha^{(n)}$ for attributes α from all the attribute groups Ai, where i ≤ i ≤ m, of the speech model according to the following formula:

$$m_\alpha^{(n)} = \sum_{(h,w)} N(h) \cdot p^{(n)}(w|h) \cdot f_\alpha(h,w)$$

where $N(h)$: describes the frequency with which the string of words h (history) occurs in a speech model-training corpus;

p(n) (w | h): is an iteration value for the probability with which the word w follows the history h

and

fα (h,w): represents an attribute function for the attribute α;

b) Selecting the attribute group Ai(n) for which the iteration boundary values $m_\alpha^{(n)}$ are most poorly adapted to the associated boundary values mα, by executing the following steps:

bi) for each attributes group Ai: Calculating the criterion $D_i^{(n)}$ according to the following formula:

$$D_i^{(n)} = \left[\sum_{\alpha \in Ai} t_\alpha \cdot m_\alpha \cdot \log\left(\frac{m_\alpha}{m_\alpha^{(n)}}\right) + \left(1 - \sum_{\alpha \in Ai} t_\alpha \cdot m_\alpha)\right) \cdot \log\left(\frac{1 - \sum_{\alpha \in Ai} t_\alpha \cdot m_\alpha)}{1 - \sum_{\alpha \in Ai} t_\alpha \cdot m_\alpha^{(n)})}\right)\right];$$

bii) Selecting the attribute group Ai(n) with the largest value for the criterion $D_i^{(n)}$ according to:

$$i(n) = \arg\max_j D_j^{(n)} \qquad (7);$$

biii) Updating the parameter $\lambda_\alpha^{(n+1)}$ for all the attributes α from the selected attribute group Ai(n); and

c) Repeating steps a) and b) in each further iteration step, until all boundary values $m_\alpha^{(n+1)}$ converge with a desired convergence accuracy.

3. A method as claimed in Claim 2, characterized in that the following initialization steps are carried out before the first run-through of steps a) - c) of claim 2:
a') Determining values for the convergence increments $t\alpha$; and
a'') Initializing p(0)(w | h) with any set of parameters $\lambda_\alpha^{(0)}$.

4. A method as claimed in Claim 3, characterized in that the values of the convergence increments $t\alpha$ for each attributes group Ai are calculated in step a') as follows:

$$t_\alpha = \frac{1}{M_i} \text{ with } M_i = \max_{(h,w)}\left(\sum_{\alpha\in A_i} f_\alpha(h,w)\right)$$

5. A method as claimed in one of the above claims, characterized in that the function G represents a Generalized Iterative Scaling (GIS) training algorithm, and is defined as follows:

$$\lambda_\alpha^{(n+1)} = G = \lambda_\alpha^{(n)} + t_\alpha \cdot \log\left(\frac{m_\alpha}{m_\alpha^{(n)}} \cdot \frac{1-\sum_{\beta\in Ai(n)} t_\beta . m_\beta^{(n)}}{1-\sum_{\beta\in Ai(n)} t_\beta \cdot m_\beta}\right),$$

where α represents a specific attribute and β all the attributes from the selected attribute group Ai(n).

6. A method as claimed in one of Claims 2 to 5, characterized in that the attribute function $f\alpha$ is an orthogonalized attribute function f_α^{ortho}, which is defined as follows:

$$f_\alpha^{ortho}(h,w) = \begin{cases} 1 & \text{if } \alpha \text{ is the attribute with the highest range in Ai which correctly describes the string of words (h,w)} \\ 0 & \text{otherwise} \end{cases}$$

7. A method as claimed in Claim 6, characterized in that the desired orthogonalized boundary value m_α^{ortho} is calculated according to:

$$m_\alpha^{ortho} = m_\alpha - \sum_{(*)} m_\beta^{ortho}$$

where (*) contains all the higher ranging attributes β which include the attribute α and which come from the same attribute group as α.

8. A speech recognition system (10) comprising a recognition device (12) for recognizing the semantic content of an acoustic signal, in particular a voice signal, recorded by a microphone (20) and made available, by mapping parts of this signal onto predefined recognition symbols as supplied by the maximum entropy speech model MESM, and for generating output signals which represent the recognized semantic content; and a training arrangement 14 for adapting the MESM to recurring statistical patterns in the speech of a specific user of the speech recognition system (10), characterized in that the training arrangement 14 calculates free parameters λ in the MESM in accordance with the method as claimed in Claim 1.

9. A training arrangement (14) for adapting the maximum entropy speech model (MESM) in a speech recognition system (10) to recurring statistical patterns in the speech of a specific user of the speech recognition system (10), characterized in that the training arrangement (14) calculates free parameters λ in the MESM in accordance with the method as claimed in Claim 1.